

The Ruth H. Hooker Research Library

and Technical Information Center



Naval Research Laboratory Library Exploits Optical Storage and Retrieval Technology

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1. INTRODUCTION

The Ruth H. Hooker Research Library and Technical Information Center of the Naval Research Laboratory (NRL) in Washington, D.C. has installed an optical disk system for the storage and retrieval of its very large collection of technical report literature. The reports are stored as optical images on 12-inch 6.55 gigabyte disks housed in a 50-platter Sony jukebox. The reports are fully indexed in a Cuadra Star database resident on a Pentium microcomputer and the optical images are seamlessly linked to this system. The images are retrieved by using the ImageExtender capability of Cambridge imaging software. The library patron uses a 486 PC viewing station with full-page monitor to search the database, identify, retrieve and view needed reports. All or part of the retrieved report can be printed out by the user on a high speed printer.

As this system contains information that has been classified or restricted for security reasons, its use is limited to within the library and to those users with the appropriate clearances. To provide increased access to that part of the information that is not restricted, portions of the reports collection are being simultaneously placed on a second optical system. This second system will be networked to provide scientists and engineers at the Laboratory with desktop access to scientific information. This new system, which is being implemented as a prototype for future development, will utilize 5.25-inch rewritable optical media in a juke box. It will contain, in addition to the reports literature, journal articles.

2. THE IMAGING SYSTEM

The first journal information to be made available is an image file of 3,500 articles written by NRL employees and published in journals during the past six years. As these articles were written by the authors as part of their official duties as employees of the U.S. Government, they are not copyrighted and there are no restrictions on providing electronic copies over the campus network. The first copyrighted journals that the Library will make available electronically to the NRL research community are pre- publication issues of Physical Review E and Physical Review Letters. This undertaking is a cooperative experimental effort between the NRL Library and the American Physical Society to evaluate the use of current journal information in electronic formats by researchers. This experiment is part of the Library's on-going efforts to deliver information directly to the researcher's desktop, a capability currently implemented for text information through the Library's campus-wide information system called the InfoNet. The InfoNet provides users in their offices and laboratories with a single menu-driven interface through which they can access to CD-ROM databases, library catalogs, laboratory management information databases and Internet resources.

Optical image technology has the potential to revolutionize the traditional operation of a library and to change the role of libraries in the storage and dissemination of information. This technology brings to reality a scenario in which a librarian, an information specialist or a scientist can sit in an office environment, identify a paper, document or picture and retrieve the item in minutes without leaving the area.

The optical disk system used for reports storage is located in the Research Reports Section of the Library. The Research Reports Section was created in 1945 when it was thought that the end of World War II meant

the end of the production of reports by government agencies and by government contractors. The existing reports at NRL were gathered together to form an archive collection that, it was believed, once organized would not grow very much. However, the opposite proved to be the case. The production of technical reports continued to accelerate during the following decades. At the time that the conversion of paper reports to optical storage began, about 300,000 report titles were on the Library's shelves. Many of these reports are invaluable and irreplaceable, dating back to the early 40's with some reports even older. They cover research in such areas as physics, chemistry, oceanography, electronics, metallurgy, optics, engineering, computer science and artificial intelligence. They originate in research facilities located at government installations, universities and corporate laboratories not only in this country but also abroad. The first segment of this collection to be put on optical disk is a group of 140,000 reports averaging 55 pages each. Over one-third of the collection, about 80,000 reports or 4.5 million pages, have already been scanned.

The reports take a one way trip to the scanner. The quality of the images is consistently good enough to allow the destruction of the reports after they have been scanned and spot-checked. Reports are retrieved by the user at a viewing station. The user searches the Star data base. When the search is complete the user views the search results. Once a report is identified it can be recalled by placing the cursor in the "Document Number" field and pressing a function key. The report appears on the screen side-by-side with the search results. The user can view the report this way or the screen can be changed to display only the report.

The report can then be viewed one or two pages at a time on the screen and read sequentially or the user can skim through the report or page forward or back at any desired pace. Pages from different sections of the report or from two different reports can be displayed simultaneously for comparison. A page can be enlarged for detail or reduced in size to allow other pages to be displayed on the screen. Pages can be rotated or their polarity can be reversed so that the white portions appear black and vice versa. All or part of the report can be printed out by a simple command. The same report can be viewed simultaneously at more than one work station.

The ability to identify the specific document to be retrieved has become a stumbling block for many optical system designers. Hundreds of thousands of pages of records placed on optical disk can rapidly submerge individual items in a ocean of data. Some designers solve this problem by superimposing an indexing system directly on the optical disk, but this takes both time (for indexing) and disk space (for storing index terms). Some designers superimpose ASCII text that can be searched word by word directly on the disk, but this again takes time (for OCRing) and disk space (for storing the ASCII text). An indexing program can be expensive and if the wrong one is chosen very costly indeed; if the cataloging information is superimposed on the optical disk, it will be very difficult to change.

The NRL Library finessed this retrieval dilemma by keeping the retrieval system entirely separate from the Optical Disk System. It elected to use as its retrieval system the online reports Cuadra Star catalog that had been in use since 1987. Star provided a large number of fields allowing for indexing of reports by over 100 access points and offered good Boolean search capabilities. In 1993, the Cambridge ImageExtender software was installed to provide an interface between the catalog and the stored images. To the user the retrieval system and the images now appear to be a single system. The result is an online reports catalog that serves not only as a finding tool but displays for the user the item itself.



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Updated: 27-NOV-95

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